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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Manfred Roessler

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EXAMINER

MCGRAW, TREVOR EDWIN

ART UNIT

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3752

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/531,407	Applicant(s) ROESSLER ET AL.	
	Examiner Trevor E. McGraw	Art Unit 3752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gray (US 4,245,789) in view of Maier et al. (US 5,732,888) and further in view of Denton et al (US 5,226,975).

In regard to Claim 7, Gray teaches a fuel injector with a solenoid assembly (14), an armature (73) acted upon by a spring (77) in the closing direction, a valve needle (72) that is connected to the armature (73) by force locking where a valve closure member (Figure 1) is formed which forms a sealing seat with a valve needle surface (Figure 1) where the armature stop face (73s) strikes against a stop face (63s) of an inner pole (63) where the surface structure of the armature stop face (73s) and the stop face of the inner pole (63s) have raised and recessed dome shaped areas (Figure 2) at a height difference of 0.4 μm to 0.8 μm for the inner pole stop face (63s) and 0.2 μm to 0.3 μm for the armature stop face (73s). It is noted to Applicant that the rough surfaces of Gray are utilized to prevent hydraulic lock.

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Although Gray substantially teaches the present invention it fails to teach where an armature stop face (73s) and inner pole piece being coated with a plurality of chromium layers where the height difference between the raised and recessed dome shaped areas are in a height difference between 5 μm to 10 μm and is reduced to between 4 μm and 5 μm during use of the fuel injector.

However, Maier et al teach having a chromium coating used with on an armature stop face and on a stop face of an inner pole where the coating is the same on the armature and inner pole stop faces to provide a wear resistance medium for an armature (see column 6, lines 1-11).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the present invention was made to apply the chromium coating as taught by Maier et al to the armature stop face and inner pole piece taught by Gray to provide for a higher resistant coating to preclude or reduce operational wear per cycle of the fuel injector. The application of the coating of Maier et al onto the dome shaped rough surface of Gray would also permit improved prevention hydraulic sticking of the armature and pole piece stop face due to the thicker raised and recessed areas of the armature and pole piece surfaces of Gray (the height of the raised and recessed areas of Gray would increase to 10 μm as a result of the Maier et al coating; see Maier et al column 4, lines 11-12).

The combined device of Gray in view of Maier et al as described above substantially teach the present invention with the exception of the chromium coating being in a plurality of layers.

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Conversely, Denton et al teach depositing a chromium coating in a plurality of layers (see column 2, lines 57-65) onto a surface.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the present invention was made to have applied the chromium layer of Gray in view of Maier et al in a plurality of layers as taught by Denton et al in order to permit for optimal dimensional extended wear integrity of fuel injector components.

The device of Gray in view of Maier et al and further in view of Denton et al when combined teach where a surface structure of the coating has raised areas and recessed areas and where the raised areas have a dome-shaped design with the height difference between the raised areas and recessed areas initially being between 5 μm and 10 μm as a result of applying the plurality of chromium layers (see Denton et al column 2, lines 57-65) on the raised and recessed areas (see where surface of Gray has raised and recessed areas; see Gray column 8, lines 42-62) on the armature stop face and inner pole stop face (see Maier et al column 6, lines 1-11) of Gray due to Maier et al teaching a thickness of 10 μm (see Maier et al column 4, lines 11-12).

The device of Gray in view of Maier et al and Denton et al when combined would inherently reduce the levels of the dome shaped chromium layers on the armature and inner pole stop face to between 4 μm and 5 μm as a result of wear due to multiple impacts between the armature and inner pole stop faces (see Maier et al column 4, lines 27-30) and having a thick coating would prolong the life of the armature and pole piece stop faces.

Response to Arguments

Rejection under 35 USC § 103

Applicant's arguments with respect to claim 7 have been considered but are moot in view of the new ground(s) of rejection.

It is noted to Applicant that Claim 7 is a product by process Claim. It has been held that the patentability of a product does not depend on its method of production (e.g. the raised and recessed areas...). If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (See MPEP 2113).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kuwabara et al (US 20020008320).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trevor McGraw whose telephone number is (571) 272-7375. The examiner can normally be reached on Monday-Friday (2nd & 4th Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on (571) 272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/T. E. M./
Examiner, Art Unit 3752

/Len Tran/

Supervisory Patent Examiner, Art Unit 3752